

Surf Forecasting

NEMOC TRAINING DEPARTMENT

Here are some general Wave terms:

- ▮ Fetch: Area where waves are generated by a wind having a constant direction and speed.**
- * Sea Waves: Waves generated or sustained by winds within their FETCH.**
- ▮ Swell Waves: Waves which have traveled out of their FETCH.**

- ▮ **Crest:** Highest part of a Wave.
- ▮ **Trough:** Lowest part of wave between two crests
- ▮ **Height:** Vertical distance between a trough and a crest
- ▮ **Wavelength:** Horizontal distance between successive crests.
- ▮ **Period:** Time required for a crest to traverse a distance equal to one wavelength.

Some Surf Factors:

- ▮ **Surf Zone**: The area between the outermost breaker and the limit of wave uprush.
- ▮ **Breaker Angle**: The angle a breaker makes with the beach.
- ▮ **Significant Breaker Height**: The average height of the 1/3rd highest waves of a given wave group.
- ▮ **Littoral Current**: A current moving parallel to and adjacent to the shoreline.

▮ **Surob**: An observation of surf conditions in a certain format.

▮ **Deep Water**: Water depth is greater than $1/2$ the wave length.

***Shallow Water**: Water depth is less than $1/2$ the surface wavelength, surface waves are noticeably affected by bottom topography.

***Breaker**: A wave tripped by shoaling water. There are three types.

Spilling: Energy the wave has transported across the sea is released gradually over a considerable length of time and length of breaker.

*** The wave peaks up until it is steep but not vertical. Only the topmost portion of the wave curls over and descends.**

□ Beach slope is normally flat.

Surging: Wave crest advances faster than the base of the wave to suggest a plunging breaker. Then the wave advances faster than the crest, the plunging is arrested and the breaker surges up the beach face as a wall of water which may or may not be white water.

- ▮ **Beach slope is normally very steep.**

- ▮ **Less frequently observed**

Plunging: Energy is released suddenly into a downwardly directed mass of water. Wave peaks up until it is an advancing vertical wall of water. Crest curls far over and descends violently into the preceding trough.

□ Air is trapped in this process and escapes explosively behind the wave, throwing water high above the surface.

□ More common on the west coast of North America and the Pacific Ocean than the Atlantic.

□ Beach slope is usually steep.

▮ Determining Breaker type is related to:

*** Deep water wave height, wave period and beach slope.**

▮ Beach profile (I. E. degree of protection), wave refraction, and offshore versus onshore winds are among some of the many other issues that contribute to determining breaker type.

- ▮ Breaker height and type are the most important factors in judging the feasibility of an Amphibious operation on any Beach.
- ▮ Surf characteristics are just as irregular as the ocean bottom topography over which the swell travels as it advances toward the beach.
- ▮ Multiple wave trains, sandbars, slope, tides, refraction, and littoral currents also have an impact on Amphibious

SURF

Forecast

Elements of a SURF Forecast:

- **Alpha: Significant Breaker Height - mean value of the 1/3rd highest breakers on the beach. (1/2 ft)**
- **Bravo: Maximum Breaker Height - Highest breaker forecasted during the period. (1/2 ft)**
- **Charlie: Period - Time interval between breakers. (1/2 sec)**
- **Delta: Breaker types (%)**

□ Echo: Angle of breaker with the beach. The acute angle the breaker makes with the beach. Indicate direction toward which the breaker is moving.

□ Foxtrot: Littoral Current - measured to the nearest 1/10th kt. The direction towards which a floating object is carried is also provided.

□ Golf: Surf Zone - The predominant number of breakers in and the width of the surf zone in ft.

□ Hotel: Additional Remarks -

▮ 100 successive breakers must be observed for a Surob to be of any use in determining a Surf forecast.

Modified

Surf

Index

□ A single dimensionless number which provides a measure of the likely conditions to be encountered in the surf zone.

□ It provides a guide for judging the feasibility of landing operations for each type of landing craft.

□ Surf capability of landing craft and amphibious vehicles computed by this method assumes such craft are in good condition and does not take into account training personnel operating the vehicles.

▮ **Modified Surf Limit:** The maximum that should be attempted for routine operations. All vehicles are given these limits and are listed within the SURF Manual.

▮ If the index that you calculated exceeds the Limits listed in the manual, the landing is not feasible without increasing the casualty/incident rate.

▮ No matter what, there is always an inherent danger in amphibious landings regardless of the calculated SURF Index.

▮ SURF Forecasts can be computed by:

- ▮ Hand using the SURF Manual and SUROBS received from the SEAL Team or Observer.**
- ▮ GF MPL using similar input but allowing the software to calculate the end result.**

Q. Define significant breaker height.

A. The average height of the 1/3rd highest waves of a given wave group.

Q. How many breakers must be observed for a SUROB to be of use?

A. 100

Q. What are the three breaker types?

A. Spilling, plunging and surging.

ANY QUESTIONS?